

IN THE CLAIMS:

1. (Currently amended) A method of fabricating an article protected by a thermal barrier coating system, comprising the steps of
providing an article substrate having a substrate surface; thereafter
producing a flattened bond coat on the substrate surface, the step of producing the flattened bond coat including the steps of
depositing a bond coat on the substrate surface, the bond coat having a bond coat surface, and
processing the bond coat to achieve a flattened bond coat surface having an average grain boundary displacement height of less than about 3 micrometers; and thereafter
depositing a thermal barrier coating overlying the bond coat surface, the thermal barrier coating comprising yttria-stabilized zirconia having a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia.
2. (Original) The method of claim 1, wherein the step of providing the article substrate includes the step of
providing the article substrate comprising a nickel-base superalloy.
3. (Original) The method of claim 1, wherein the step of providing the article substrate includes the step of
providing the article substrate comprising a component of a gas turbine engine.
4. (Original) The method of claim 1, wherein the step of depositing the bond coat includes the step of
depositing a diffusion aluminide bond coat.
5. (Original) The method of claim 1, wherein the step of depositing the bond coat includes the step of

depositing a platinum aluminide bond coat.

6. (Original) The method of claim 1, wherein the step of processing the bond coat includes the step of
flattening the bond coat surface without removing material from the bond coat surface.

7. (Original) The method of claim 1, wherein the step of processing the bond coat includes the step of
peening the bond coat.

8. (Original) The method of claim 1, wherein the step of processing the bond coat includes the step of
peening the bond coat with a peening intensity of from about 6A to about 12A.

9. (Original) The method of claim 1, wherein the step of processing the bond coat includes the step of
flattening the bond coat surface by removing material from the bond coat surface.

10. (Original) The method of claim 1, wherein the step of processing the bond coat includes the step of
polishing the bond coat.

11. (Original) The method of claim 1, wherein the step of processing the bond coat includes the step of
polishing the bond coat by an approach selected from the group consisting of tumbling, vibrolapping, and electropolishing.

12. (Original) The method of claim 1, wherein the steps of depositing the bond coat and processing the bond coat are performed concurrently.

13. (Original) The method of claim 1, wherein the step of processing the bond coat is performed after the step of depositing the bond coat.

14. (Currently amended) The method of claim 1, wherein the step of processing the bond coat includes the step of
producing a bond coat surface having an average grain boundary displacement height of less than about ~~3 micrometers~~ 1 micrometer.

15. (Original) The method of claim 1, wherein the step of depositing the thermal barrier coating includes the step of
depositing the thermal barrier coating by physical vapor deposition.

16. (Original) The method of claim 1, wherein the step of depositing the thermal barrier coating includes the step of
depositing the thermal barrier coating to have the yttria content from about 3.8 to about 4.2 percent by weight of the yttria-stabilized zirconia.

17. (Currently amended) A method of fabricating an article protected by a thermal barrier coating system, comprising the steps of
providing an nickel-base superalloy article substrate comprising a component of a gas turbine engine and having a substrate surface; thereafter
depositing a platinum aluminide bond coat on the substrate surface, the bond coat having a bond coat surface; thereafter
processing the bond coat to flatten the bond coat surface to have an average grain boundary displacement height of less than about 3 micrometers; and thereafter
depositing a thermal barrier coating overlying the bond coat surface, the thermal barrier coating comprising yttria-stabilized zirconia having a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia.

18. (Withdrawn) An article protected by a thermal barrier coating system, comprising

an article substrate having a substrate surface;
a bond coat on the substrate surface, the bond coat having an average grain boundary displacement height of less than about 3 micrometers; and
a thermal barrier coating overlying the bond coat surface, the thermal barrier coating comprising yttria-stabilized zirconia having a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia.

19. (Withdrawn) The article of claim 18, wherein the article substrate is a nickel-base superalloy.

20. (Withdrawn) The article of claim 18, wherein the article substrate is a component of a gas turbine engine.

21. (Withdrawn) The article of claim 18, wherein the bond coat is a diffusion aluminide bond coat.

22. (Withdrawn) The article of claim 18, wherein the bond coat is a platinum aluminide bond coat.